

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A digital watermark embedding method of embedding watermark information in an image signal, comprising:

extracting a specific frequency component signal having a phase and an amplitude from the input image signal;

controlling at least ~~one of a~~ the phase and ~~amplitude~~ of the specific frequency component signal in accordance with the watermark information to produce at least one phase-controlled specific frequency component signal;

outputting an image signal embedded with the watermark information by superposing the ~~specific frequency component signal, at least one of the phase and amplitude of which has been controlled,~~ phase-controlled specific frequency component signal on the input image signal; and

limiting an amplitude of the specific frequency component signal.

Claim 2 (Canceled).

Claim 3 (Currently Amended): The digital watermark embedding method according to claim 1, wherein ~~extraction of~~ extracting the ~~specified~~ specific frequency component signal ~~is randomized~~ includes extracting the specific frequency component signal in random.

Claims 4-20 (Canceled).

Claim 21 (Currently Amended): A digital watermark embedding method of embedding watermark information in an image signal, comprising:

extracting a specific frequency component signal containing a phase and an amplitude from the input image signal;

~~controlling at least one of a~~ shifting the phase and amplitude of the specific frequency component signal in accordance with the watermark information to produce at least one phase-shifted specific frequency component signal;

outputting an image signal embedded with the watermark information by superposing the phase-shifted specific frequency component signal ~~whose phase is shifted~~, on the input image signal; and

limiting an amplitude of the specific frequency component signal.

Claim 22 (Currently Amended): The digital watermark embedding method according to claim 21, wherein ~~extraction of~~ extracting the ~~specified~~ specific frequency component signal includes extracting the specific frequency component signal in random.

Claim 23 (New): The digital watermark embedding method according to claim 1, wherein outputting the image signal comprises subjecting the phase-controlled specific frequency component signal to a nonlinear process, and superposing the linear-processed specific frequency component signal on the image input signal.

Claim 24 (New): A digital watermark detection method comprising:

extracting a specific frequency component signal containing a phase and an amplitude from an input image signal in which watermark information is embedded;

controlling at least the phase of the specific frequency component signal extracted to obtain a phase-controlled specific frequency component signal; and

performing a correlation operation between the phase-controlled specific frequency component signal and the input image signal to extract the watermark information.

Claim 25 (New): The digital watermark detection method according to claim 24, further comprising limiting the amplitude of the specific frequency component signal.

Claim 26 (New): The digital watermark detection method according to claim 24, further comprising randomizing the specific frequency component signal extracted.

Claim 27 (New): The digital watermark detection method according to claim 24, wherein performing the correlation comprises subjecting the phase-controlled specific frequency component signal to a nonlinear process, and performing the correlation operation between the image input signal and the phase-controlled specific frequency component signal subjected to the nonlinear process.

Claim 28 (New): A digital watermark embedding apparatus which embeds watermark information in an input image signal, comprising:

an extraction unit configured to extract a specific frequency component signal containing a phase and an amplitude from the input image signal;

a control unit configured to control at least the phase of the extracted specific frequency component signal in accordance with the watermark information to produce a phase-controlled specific frequency component signal; and

a superposing unit configured to superpose the phase-controlled specific frequency component signal on the input image signal to output an image signal embedded with the watermark information.

Claim 29 (New): The digital watermark embedding apparatus according to claim 28, further comprising an amplitude limiter which is inserted between the extraction unit and the superposing unit and limits the amplitude of the specific frequency component signal.

Claim 30 (New): The digital watermark embedding apparatus according to claim 28, wherein a characteristic of at least one of the extraction unit and the control unit is randomized using randomizing information.

Claim 31 (New): The digital watermark embedding apparatus according to claim 28, further comprising a nonlinear filter inserted between the control unit and the superposing unit.

Claim 32 (New): A digital watermark detection apparatus which detects watermark information embedded in an input image signal, comprising:

an extraction unit configured to extract a specific frequency component signal containing a phase and an amplitude from the input image signal;

a control unit configured to control at least the phase of the specific frequency component signal extracted to produce a phase-controlled specific frequency component signal; and

a correlation computing unit configured to perform a correlation operation between the specific frequency component signal and the input image signal to extract the watermark information.

Claim 33 (New): The digital watermark detection apparatus according to claim 32, further comprising an amplitude limiter which is inserted between the extraction unit and the correlation computing unit and limits the amplitude of the specific frequency component signal.

Claim 34 (New): The digital watermark detection apparatus according to claim 32, wherein a characteristic of at least one of the extraction unit and the control unit is randomized using randomizing information.

Claim 35 (New): The digital watermark detection apparatus according to claim 32, further comprising a nonlinear filter inserted between the control unit and the correlation computing unit.

Claim 36 (New): A digital watermark embedding apparatus comprising:  
extraction means for extracting a specific frequency component signal containing a phase and an amplitude from an input image signal;  
control means for controlling at least the phase of the extracted specific frequency component signal in accordance with watermark information to produce a phase-controlled specific frequency component signal; and

superposing means for superposing the phase-controlled specific frequency component signal on the input image signal to output an image signal embedded with the watermark information.

Claim 37 (New): A digital watermark embedding apparatus according to claim 36, further comprising a limiter inserted between the extraction means and the superposing means and configured to limit the amplitude of the specific frequency component signal.

Claim 38 (New): A digital watermark embedding apparatus according to claim 36, further comprising a nonlinear filter inserted between the control means and the superposing means.

Claim 39 (New): A digital watermark detection apparatus comprising:  
extraction means for extracting a specific frequency component signal containing a phase and an amplitude from an input image signal in which watermark information is embedded;

control means for controlling at least the phase of the extracted specific frequency component signal to produce at least one phase-controlled specific frequency component signal; and

correlation computing means for performing a correlation operation between the phase-controlled specific frequency component signal and the input image signal to extract the watermark information.